



TYPES OF PATTERNS

-Mayank Gurjar

Types of patterns

Types of patterns depend upon the following factors:

- ① The shape and size of casting
- ① No. of castings required
- ① Method of moulding employed
- ① Anticipated difficulty of moulding operation

Types

1. Single piece pattern.
2. Split piece pattern.
3. Loose piece pattern.
4. Match plate pattern.
5. Sweep pattern.
6. Gated pattern.
7. Skeleton pattern
8. Follow board pattern.
9. Cope and Drag pattern.

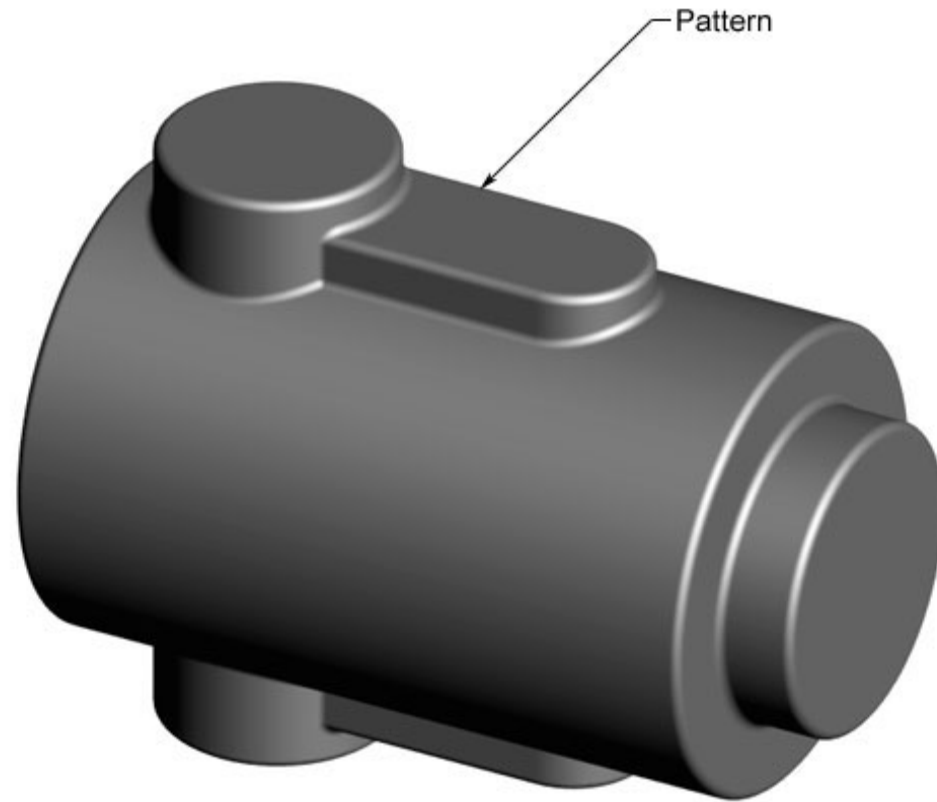
1. Single piece (solid) pattern

- Made from one piece and does not contain loose pieces or joints.
- Inexpensive.
- Used for large size simple castings.
- Pattern is accommodated either in the cope or in the drag.

Examples:

1. Bodies of regular shapes.
2. stuffing box of steam engine.

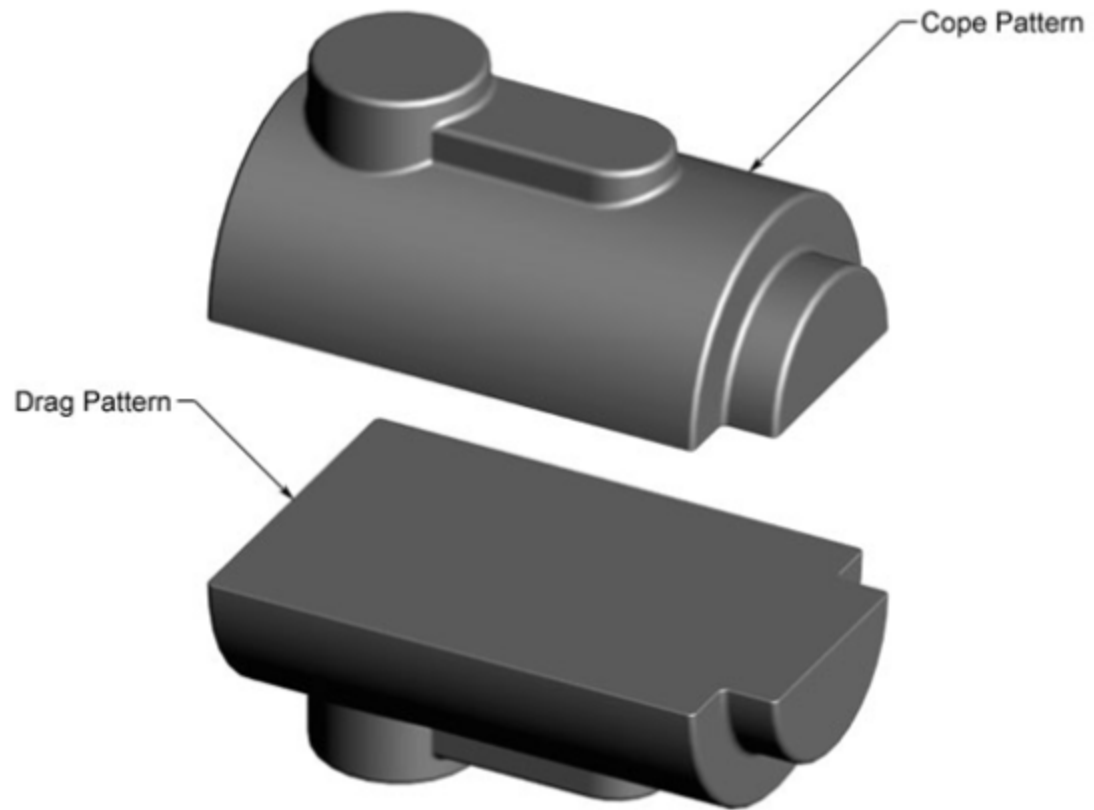
Single piece pattern



2. Split piece pattern:

- Patterns of intricate shaped castings cannot be made in one piece because of the inherent difficulties associated with the molding operations (e.g. withdrawing pattern from mould).
- The upper and the lower parts of the split piece patterns are accommodated in the cope and drag portions of the mold respectively.
- Parting line of the pattern forms the parting line of the mould.

- Dowel pins are used for keeping the alignment between the two parts of the pattern.
- Examples:
 1. Hallow cylinder
 2. Taps and water stop cocks etc.,



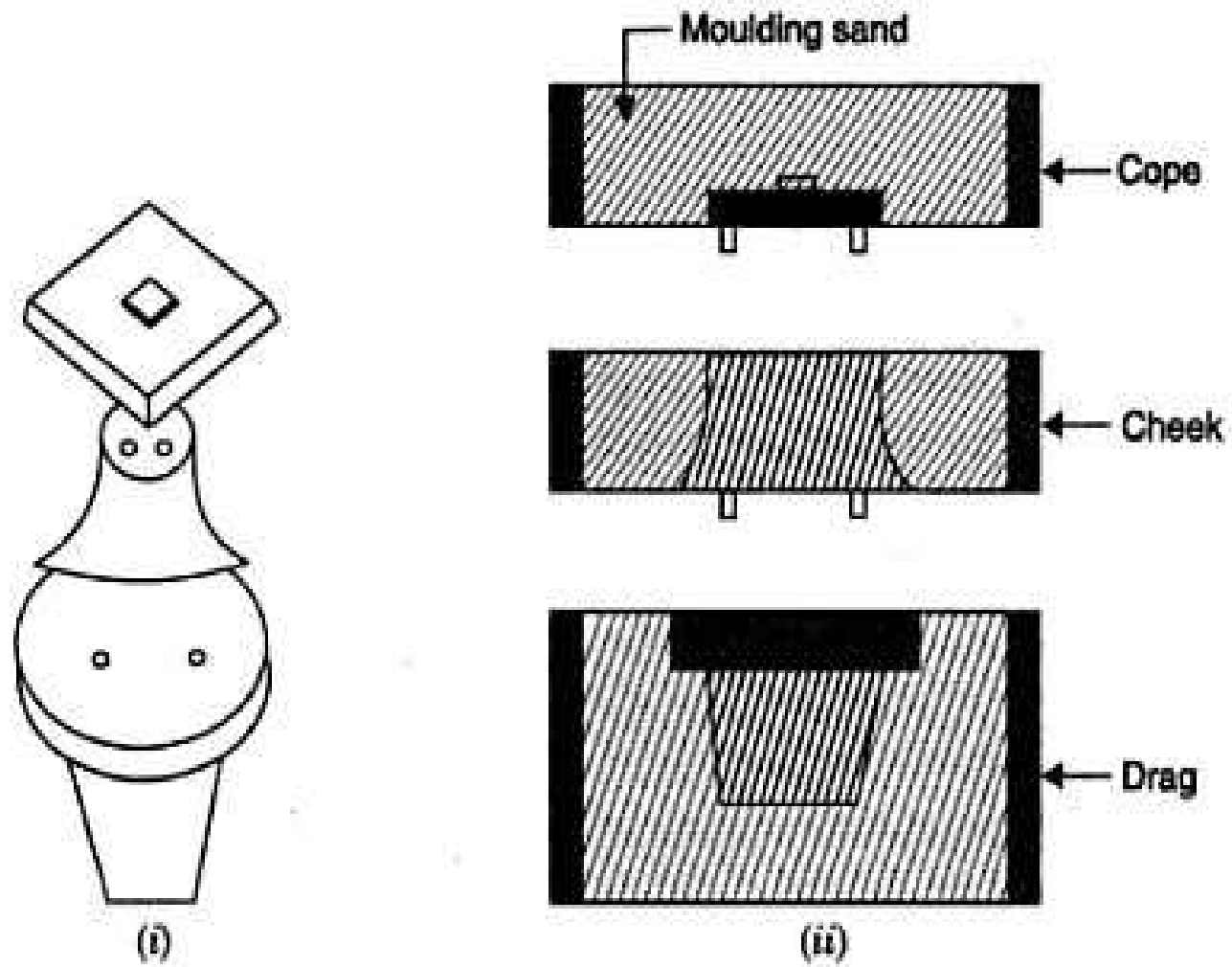
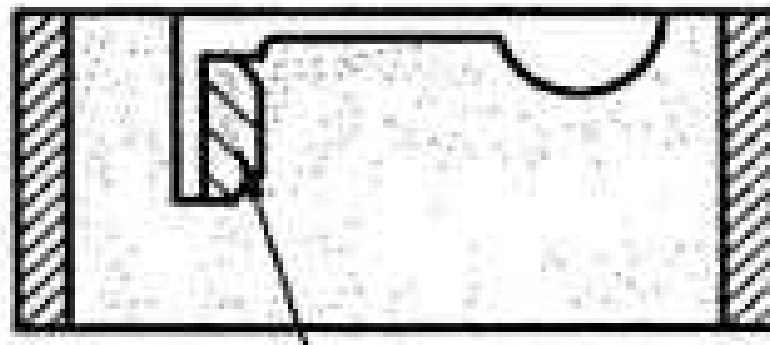
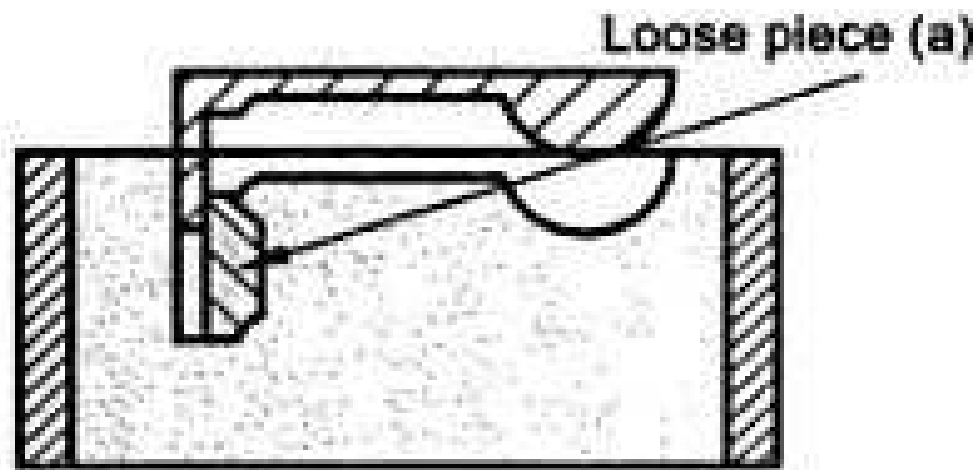


Fig. 2.3. Multipiece pattern.

3. Loose piece pattern

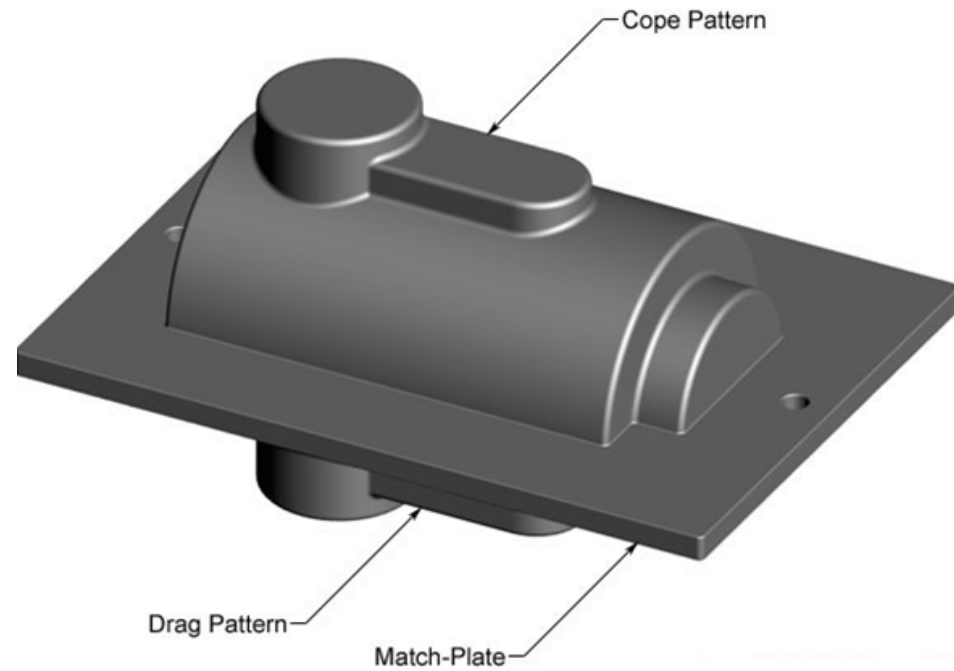
- Certain patterns cannot be withdrawn once they are embedded in the molding sand. Such patterns are usually made with one or more loose pieces for facilitating from the molding box and are known as loose piece patterns.
- Loose parts or pieces remain attached with the main body of the pattern, with the help of dowel pins.
- The main body of the pattern is drawn first from the molding box and thereafter as soon as the loose parts are removed, the result is the mold cavity.



4. Match plate pattern

- It consists of a match plate, on either side of which each half of split patterns is fastened.
- A no. of different sized and shaped patterns may be mounted on one match plate.
- The match plate with the help of locator holes can be clamped with the drag.
- After the cope and drag have been rammed with the molding sand, the match plate pattern is removed from in between the cope and drag.

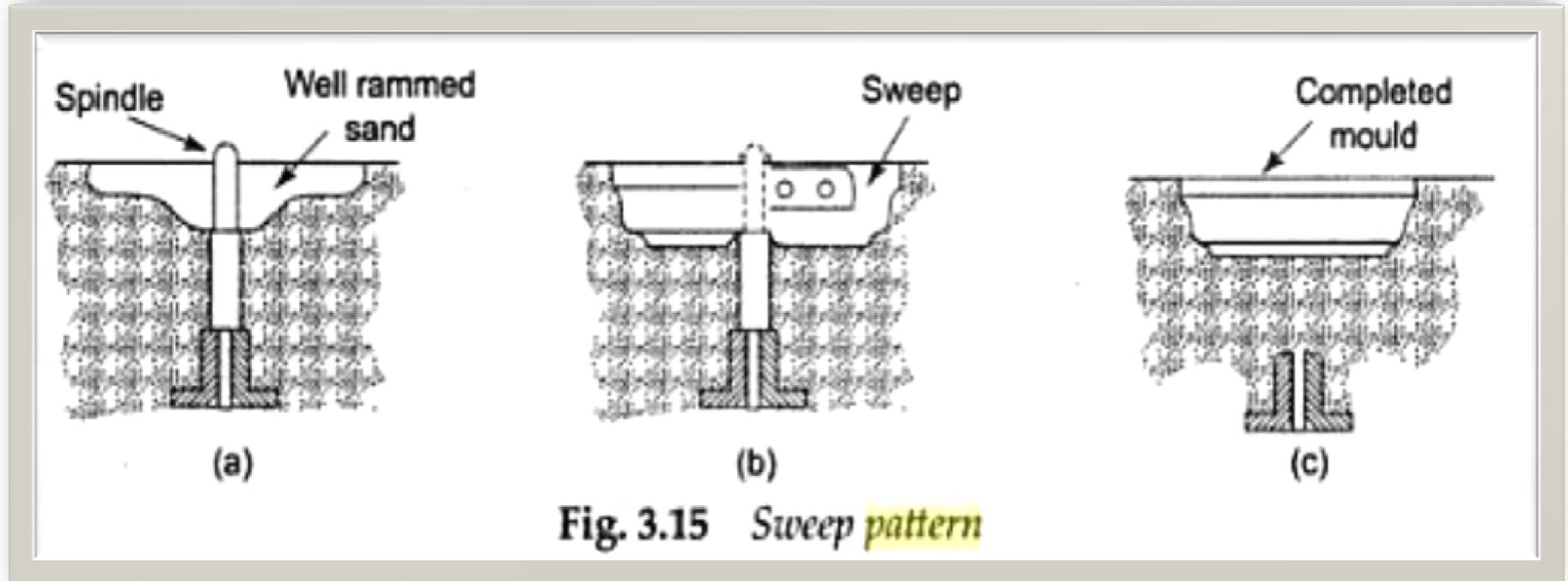
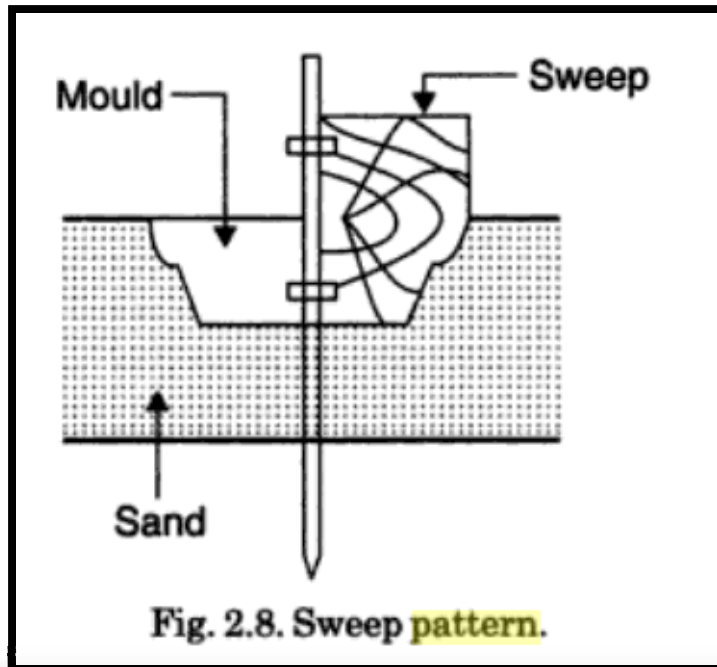
- Match plate patterns are normally used in machine molding.
- By using this we can eliminate mismatch of cope and drag cavities.



5. Sweep pattern

- A sweep pattern is just a form made on a wooden board which sweeps the shape of the casting into the sand all around the circumference. The sweep pattern rotates about the post.
- Once the mold is ready, Sweep pattern and the post can be removed.
- Sweep pattern avoids the necessity of making a full, large circular and costly three-dimensional pattern.

- Making a sweep pattern saves a lot of time and labor as compared to making a full pattern.
- A sweep pattern is preferred for producing large casting of circular sections and symmetrical shapes.



6. Gated pattern

- The sections connecting different patterns serve as runner and gates.
- This facilitates filling of the mould with molten metal in a better manner and at the same time eliminates the time and labour otherwise consumed in cutting runners and gates.
- A gated pattern can manufacture many casting at one time and thus it is used in mass production systems.
- Gated patterns are employed for producing small castings.

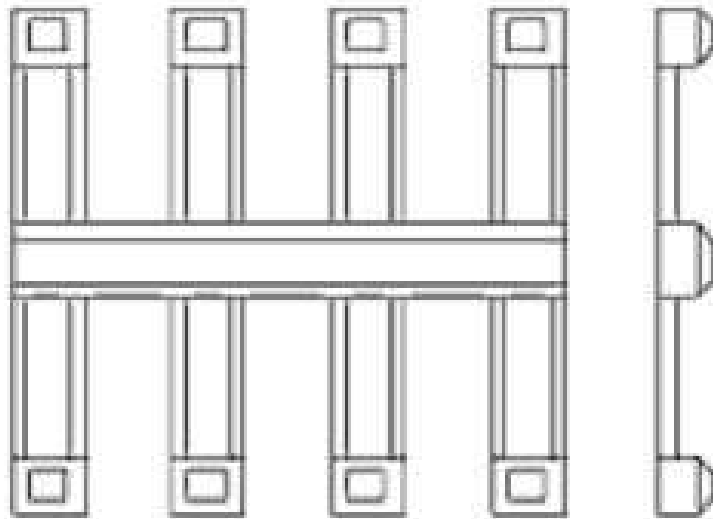
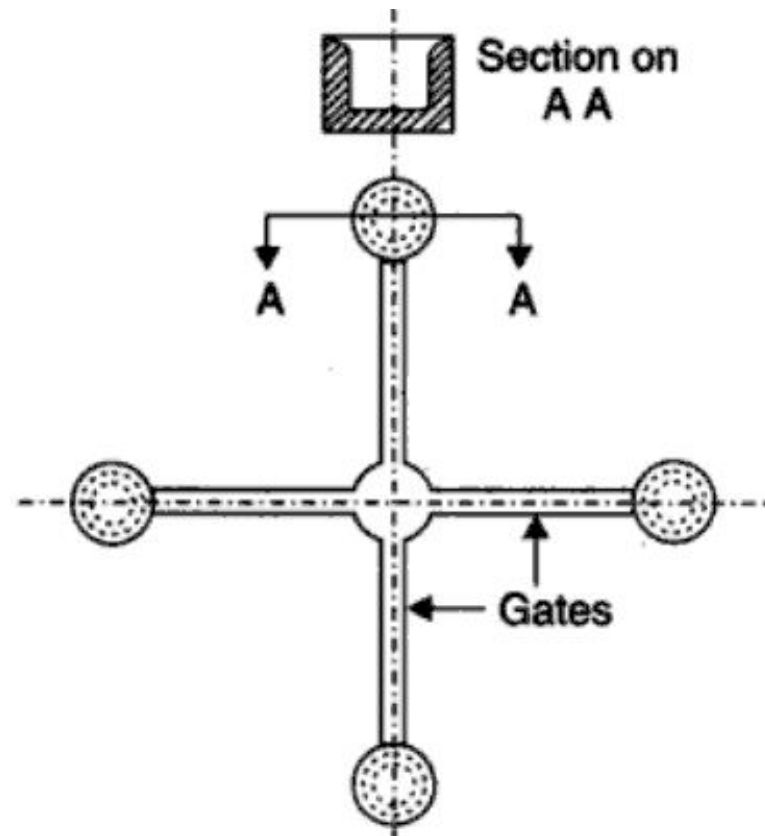


Fig. 1.10 Gated pattern



7. Skeleton pattern

- A skeleton pattern is the skeleton of a desired shape which may be S-bend pipe or a chute or something else. The skeleton frame is mounted on a metal base
- The skeleton is made from wooden strips, and is thus a wooden work.
- The skeleton pattern is filled with sand and is rammed.

- A strickle (board) assists in giving the desired shape to the sand and removes extra sand.
- Skeleton patterns are employed for producing a few large castings.
- A skeleton pattern is very economical, because it involves less material costs.

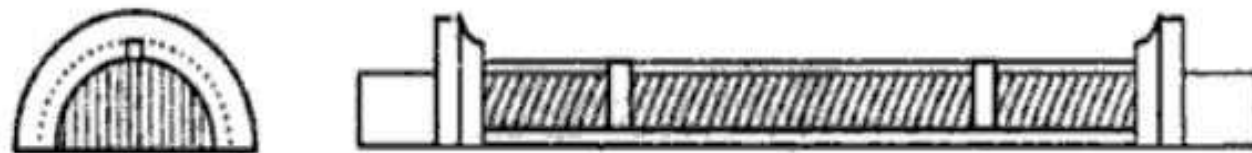


Fig. 1.78. A skeleton pattern for a flanged pipe.

8. Follow board pattern

- A follow board is a wooden board and is used for supporting a pattern which is very thin and fragile and which may give way and collapse under pressure when the sand above the pattern is being rammed.
- With the follow board support under the weak pattern, the drag is rammed, and then the follow board is withdrawn, The rammed drag is inverted, cope is mounted on it and rammed.

- During this operation pattern remains over the inverted drag and get support from the rammed sand of the drag under it.
- Follow boards are also used for casting master patterns for many applications.

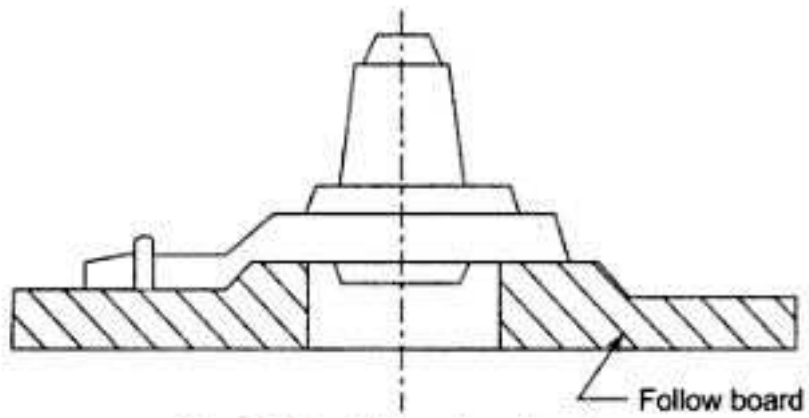


Fig. 3.14 Follow board pattern

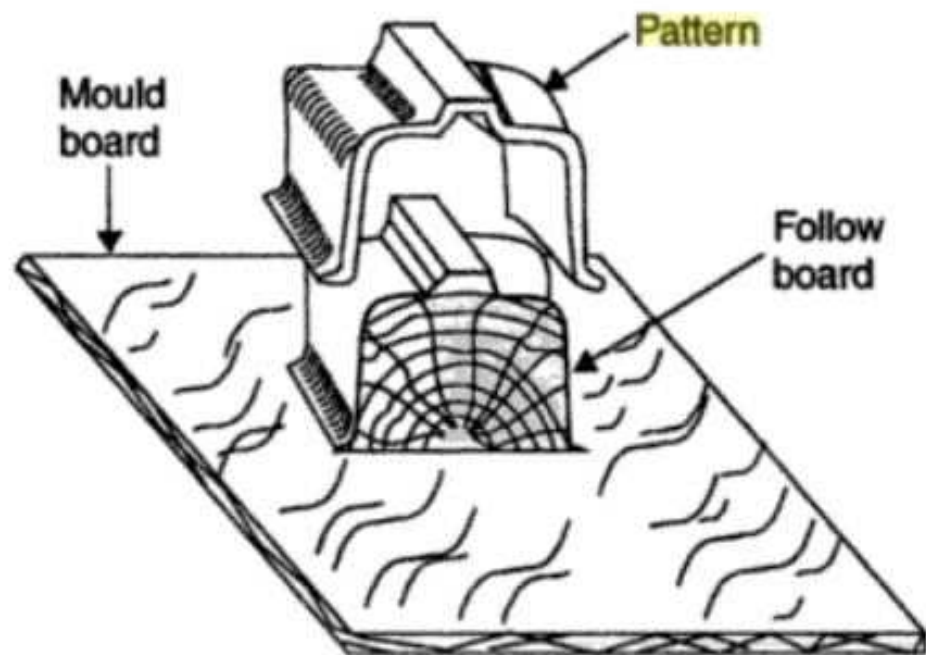


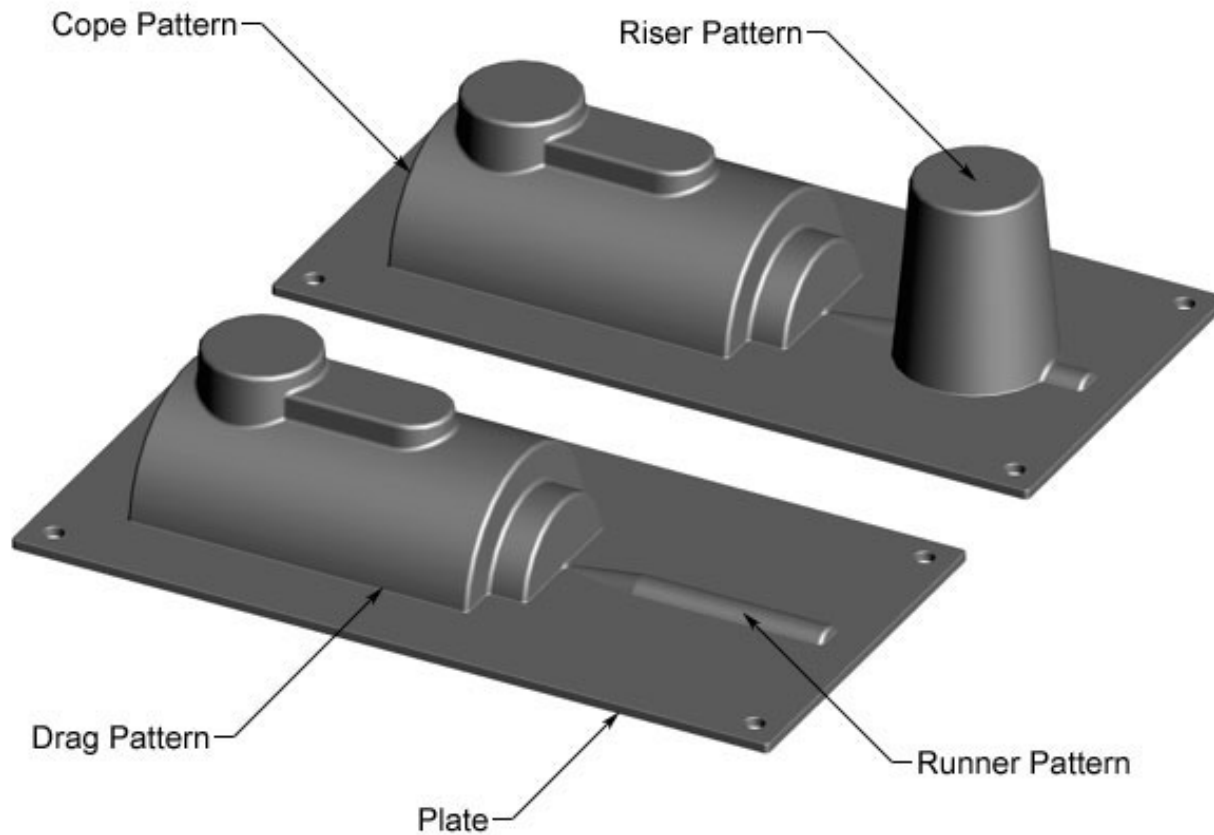
Fig. 1.80. A follow board pattern.

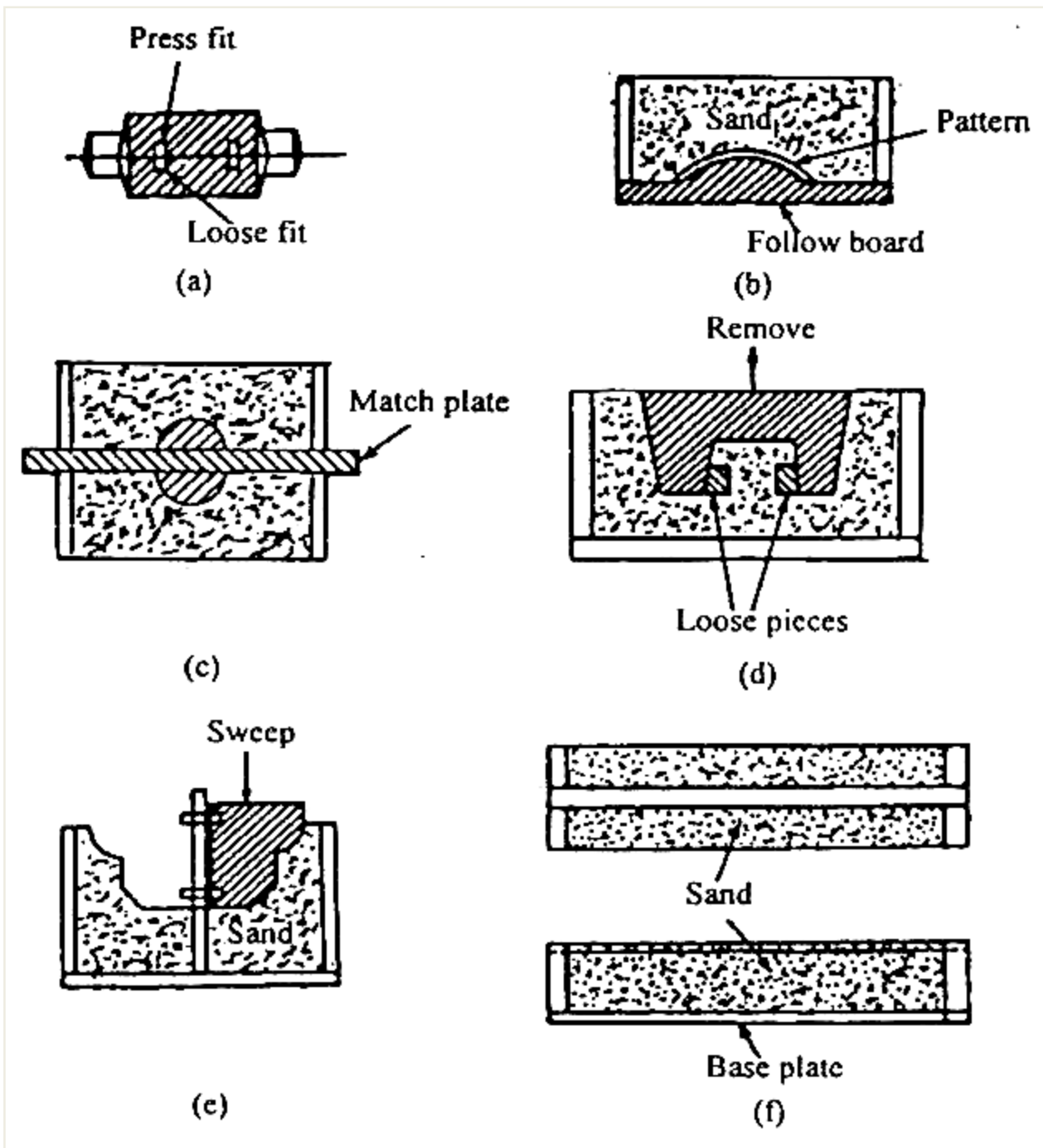
9. Cope and Drag patterns

- A cope and drag pattern is another form of split pattern.
- Each half of the pattern is fixed to a separate metal/wood plate.
- Each half of the pattern(along the plate) is molded separately in a separate molding box by an independent molder or moulders.

- The two moulds of each half of the pattern are finally assembled and the mould is ready for pouring.
- Cope and drag patterns are used for producing big castings which as a whole cannot be conveniently handled by one moulder alone.

Cope and drag pattern





- (a) Split pattern
- (b) Follow-board
- (c) Match Plate
- (d) Loose-piece
- (e) Sweep
- (f) Skeleton pattern

Types of patterns used in sand casting: (a) solid pattern, (b) split pattern, (c) match-plate pattern, and (d) cope-and-drag pattern.

